

The Great Lakes Energy Institute @ Case Western Reserve University

Vision: Empowering our faculty, students and partners to catalyze breakthroughs in energy sustainability that address the most pressing problems facing our world.

GLEI is distinct among institutions... leading to a 4X annual increase in energy funding

Prioritizing... *identifying areas of strength and growth*

Connecting... *across stakeholders to encourage partnerships and opportunities*

Empowering... *supporting stakeholders with core services that break down barriers to success*

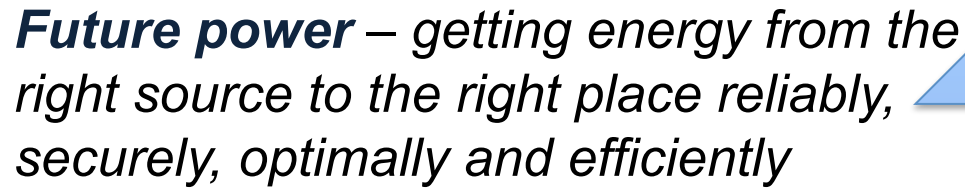


Educational
impact

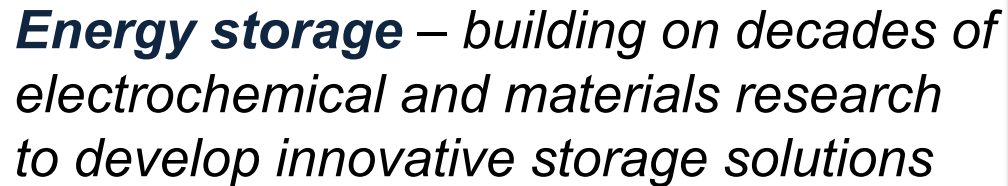
Breakthrough
discoveries

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GLEI focuses efforts at the intersection of CWRU strengths and the most pressing problems facing our world




Future power – getting energy from the right source to the right place reliably, securely, optimally and efficiently

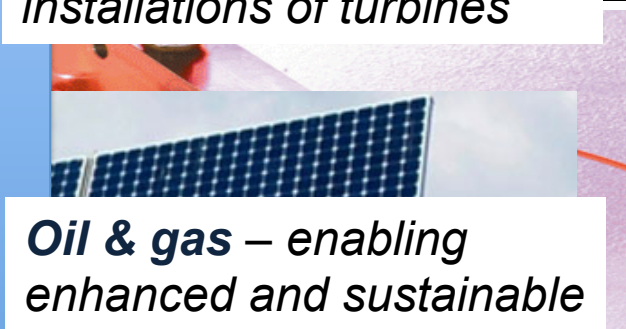


Energy storage – building on decades of electrochemical and materials research to develop innovative storage solutions

Solar energy – enabling innovation by diagnosing lifetime and degradation issues using data science and analytics



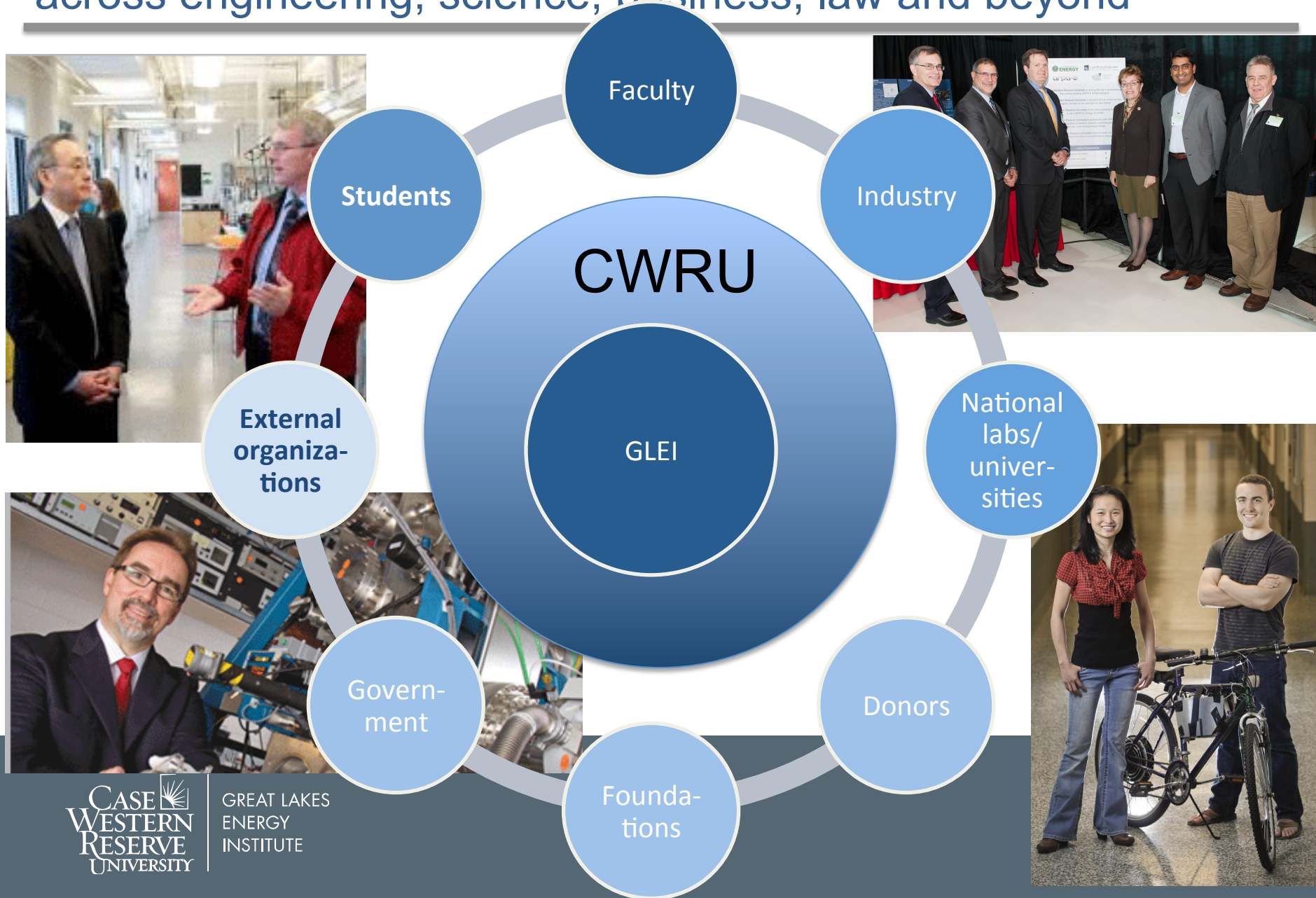
Wind – building capabilities for fresh water installations of turbines



Oil & gas – enabling enhanced and sustainable exploration and production

“Big data” science and analytics

A valuable asset to a broad spectrum of key stakeholders across engineering, science, business, law and beyond



Six years of GLEI success... and growing...



Funding

>\$70 million dollars won and raised

4X increase in annual energy funding

Strong history of success with ARPA-E

~50% “hit rate” on proposals

Stakeholders

90+ faculty engaged with GLEI

100+ industry and national lab partners

70+ students in Energy Entrepreneurship with ~\$200K in follow up \$

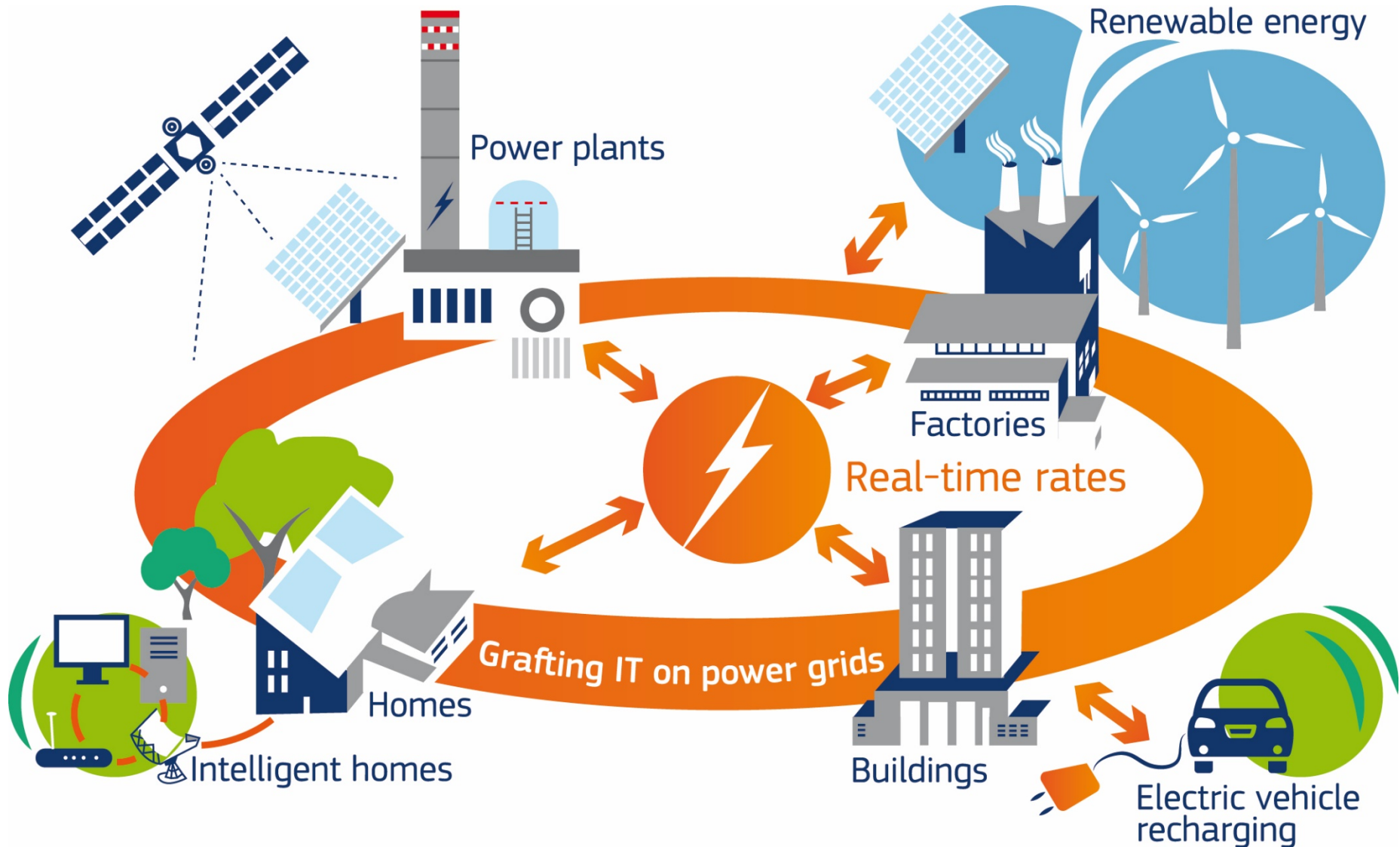
Impact

Breakthrough energy storage discoveries, including flow battery

Solar Durability and Lifetime Extension Center

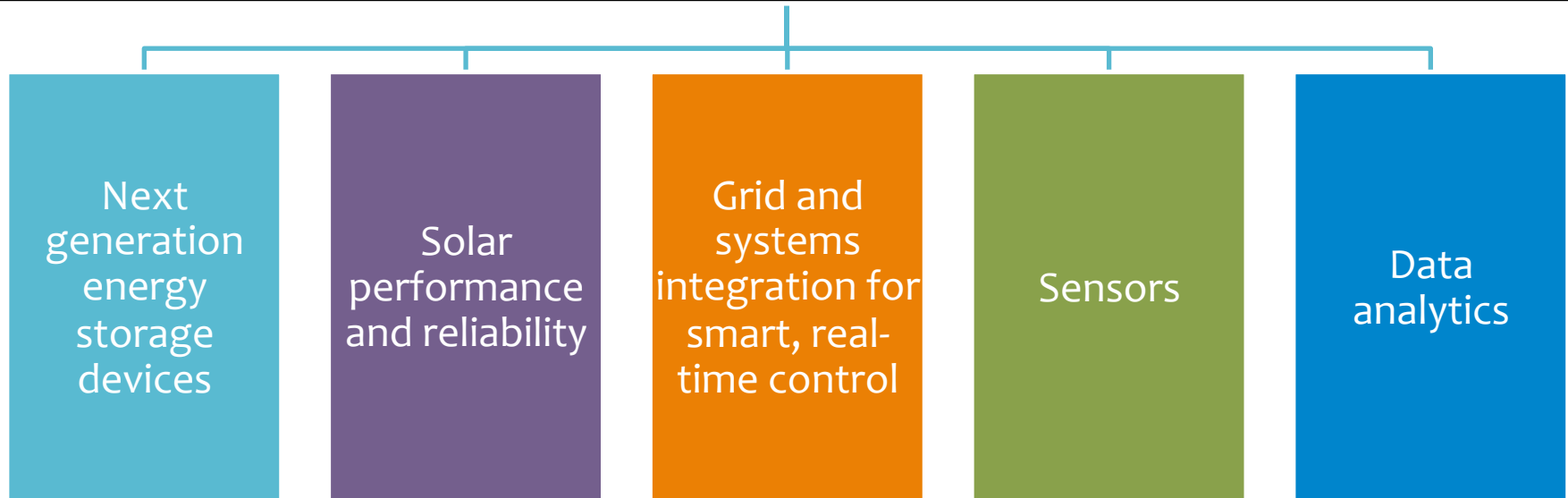
Wind energy awards: blades , magnets , offshore wind in Lake Erie

TOMORROW: A smart and connected energy ecosystem



Energy Storage and Integration is a growing platform for research, development and commercialization

ENERGY STORAGE AND INTEGRATION PLATFORM





Ohio PRESIDES:

**Ohio Partnerships for Research in Energy
Storage and Integration for **DE**fense and
Space Exploration**

PRESIDES mission

- Supporting NASA/AFRL energy storage needs
- Strengthening Ohio R&D collaborations
- Leveraging existing expertise
- Catalyzing economic growth: follow-on funding, commercialization, jobs

PRESIDES vision

**Establishing Ohio as
a national leader
in *energy storage
and integration*
for defense and
space exploration
priorities**

PRESIDES Metrics

Establishing Ohio as leader in energy storage and integration	Project deliverables met Follow on funding (industrial and federal) Invention disclosures and patents Faculty recruited
Strengthening Ohio Partnerships	Levels of collaboration Alignment with requirements Student and Faculty exchange
Economic Impact	Follow on funding (industrial and federal) Jobs created Companies created Licensing agreements
Operational Excellence	Return on investment Audit performance

2015 OFMJC process to COE award

April	May - August	September	October	November	December	January
OFMJC discusses COE concept	Meetings to clarify COE roles and responsibilities	Whitepaper (round 1) due – includes 6 project descriptions	Project selections (4 out of 6) \$1.65 million	Full proposal due	Round 1 proposals awarded	Whitepaper (round 2) due

Four initial PRESIDES COE projects

Project	Universities	Industry
High Energy Density Li-Ion Battery Based on Advanced Silicon Anodes	Lead: UA Participants: OSU, UT	pH Matter, GrafTech, Lubrizol
High Energy/Power, Long Cycle Life, Thermally Safe, Li-S Battery	Lead: UD Participants: CWRU	CRG Inc., UES Inc.
High-Performance Multifunctional Structural Energy Storage	Lead: CWRU Participants: UD	CRG Inc., Graftech
High Power/Energy, Safe, Li-ion Battery for Aircraft	Lead: UD Participants: CWRU	Inorganic Specialists